

## Video Architecture

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| <b>Title</b>                 | <b>Video Standard for Distance Learning</b> |
| <b>Category</b>              | <b>Video Architecture</b>                   |
| <b>Date Adopted</b>          | <b>(DRAFT)</b>                              |
| <b>Date of Last Revision</b> | <b>September 11, 2001</b>                   |

### ***A. Authority***

Section 86-1506 (6). "(The Nebraska Information Technology Commission shall) adopt minimum technical standards, guidelines, and architectures upon recommendation by the technical panel created in Section 86-1511."

Section 86-1506 (7) authorizes the technical panel to, "establish ad hoc technical advisory groups to study and make recommendations on specific topics." Pursuant to this the Technical Panel established the Video Standard Workgroup on 9 January 2001. The stated purpose of the group was to, "determine the next video standard for the distance learning networks of the state of Nebraska."

### ***B. Purpose and Objectives***

The purpose of this document is to define and clarify policies, standards, and guidelines that will enable all existing and future interactive distance learning facilities to achieve interoperability and an acceptable quality of service for all educational applications.

### ***C. Standards and Guidelines***

The Video Standard Workgroup has selected two finalist protocols based on criteria adopted and approved by the Technical Panel. These two finalists are MPEG-2 and H.323 with H.263 video. The workgroup is currently conducting detailed testing per the established criteria regarding bandwidth and pre-determined quality level requirements.

The judging criteria include:

#### Costs

Site - any uniquely required hardware/software cost at a site

Hub - if a hub such as an MCU is required, hardware/software cost

Operational - maintenance requirements, technicians, connectivity bandwidth, scheduling personnel, etc.

#### Bandwidth

Minimum quality - rate required for NVCN / Network 3 like quality

High quality - rate required for full-motion / broadcast quality

Lip readable – rate required for language classes

ASL readable – rate required for American Sign Language

Flexibility - range available, and rate agile v. steps

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Negotiation - automatic / manual bandwidth negotiation between points

Connectivity

Ubiquity - supported delivery methods (IP, ATM, dedicated line, PVC, etc.)

Broadcast / multicast - one-to-many without interactivity

Point-to-point - two interactive sites

Teleconference - several interactive sites (MCU/Switch required?)

Dial up / dial out - the ability for an external site to connect into a conference and not have to be brought in

Latency - amount of delay introduced by encoding process

Compatibility

Standard type - software standard or hardware standard

Backward compatibility - nature of compatibility

Installed base - How prolific is this standard already?

Life Cycle - ability to upgrade

Once a single standard is determined, all synchronous distance learning entities in the state must adopt this new video and audio standard to use state-owned networks, or to request future state funds regarding synchronous distance learning network projects. Given that all users cannot fiscally adopt the standard immediately, the workgroup will follow the technical standard adoption with recommended implementation strategies that will permit a phased migration over time. The ultimate intent of this process is to establish statewide interoperability of all synchronous distance learning networks while minimizing the fiscal impact.

This standard will not prohibit purchase of equipment that does not meet the standard providing:

1. No state funds are used.
2. The entity does not intend to pass the traffic across state owned networks.
3. A specific purchase can be grand fathered to a previous standard if it meets criteria as set forth in the implementation and migration strategies to be recommended by the Technical Panel and adopted by the NITC.

For background tutorial material on H.323/H.263, see:

<http://www.cis.ohio-state.edu/~jain/cis788-99/h323/> and

[http://www.4i2i.com/h263\\_video\\_codec.htm](http://www.4i2i.com/h263_video_codec.htm)

For background material on MPEG-2, see:

[http://www.bbc.co.uk/rd/pubs/papers/paper\\_14/paper\\_14.html](http://www.bbc.co.uk/rd/pubs/papers/paper_14/paper_14.html) and

<http://www.crs4.it/~luigi/MPEG/mpeg2.html#What%20is%20MPEG-2>

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***D. Key Definitions***

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1. Agency shall mean any governmental entity, including state government, local government, or third party entities under contract to the agency.
2. Electronic and information technology includes information technology and any equipment or interconnected system or subsystem of equipment, that is used in the creation, conversion, or duplication of data or information. The term electronic and information technology includes, but is not limited to, telecommunications products (such as telephones) information kiosks, and transaction machines, World Wide Web sites, multimedia, and office equipment such as copies and fax machines. The term does not include any equipment that contains embedded information technology that is used as an integral part of the product, but the principal function of which is not the acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information. For example, HVAC (heating, ventilation, and air conditioning) equipment such as thermostats or temperature control devices, and medical equipment where information technology is integral to its operation, are not information technology.
3. Information technology is any equipment or interconnected system or subsystem of equipment, that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission, or reception of data or information. The term information technology includes computers, ancillary equipment, software, firmware and similar procedures, services (including support services), and related resources.
4. Telecommunications are the transmission, between or among points specified by the user, of information of the user's choosing, without change in the form or content of the information as sent and received.
5. MPEG is the Motion Picture Experts Group. This association has created the standard protocol under consideration.
6. NVCN is the Nebraska Video Conference Network. It is a terrestrially based teleconference system operated by the State Division of Communications.
7. Network 3 is a satellite based teleconference system operated by the Nebraska Educational Telecommunications Commission.
8. MCU is a multi-conferencing unit. This device allows more than two sites to participate in a teleconference simultaneously.
9. ATM means asynchronous transfer mode. It is a terrestrial data transmission protocol.
10. IP means Internet protocol. It is a communications protocol used on networks for exchange of information.

**E. Applicability**GENERAL STATEMENT

These policies are intended to be sufficiently generic to apply to a wide range of governmental and educational agencies in the State of Nebraska. Each agency or operational entity must develop detailed procedures to implement broad policies and standards. Compliance with these technical policies and standards will be a requirement during consideration of funding for any projects requiring review by the NITC. Compliance may be used in audit reviews or budget reviews.

**Video Architecture**COMPLIANCE AND ENFORCEMENT STATEMENT

The Governing board or chief administrative officer of each organization must develop internal compliance and enforcement policies as part of its information standardization and interoperability efforts. Such policies should be reasonable and effective. The NITC intends to incorporate adherence to technical standards policies as part of its evaluation and prioritization of funding requests. The NITC recommends that the Governor and Legislature give due consideration to requests for technical standardization and interoperability improvements during the budget process.

***F. Responsibility***

An effective program for video standards compliance involves cooperation of many different entities. Major participants and their responsibilities include:

1. Nebraska Information Technology Commission. The NITC provides strategic direction for state agencies and educational institutions in the area of information technology. The NITC also has statutory responsibility to adopt minimum technical standards and guidelines for acceptable and cost-effective use of information technology. Implicit in these requirements is the responsibility to promote adequate quality of service and uniformity for information systems through adoption of policies, standards, and guidelines.
2. Technical Panel Video Standards Work Group. The NITC Technical Panel, with advice from the Video Standards Work Group, has responsibility for recommending video standard policies and guidelines and making available best practices to operational entities.
3. Agency and Institutional Heads. The highest authority within an agency or institution is responsible for interoperability of information resources that are consistent with this policy. The authority may delegate this responsibility but delegation does not remove the accountability.
4. Information Technology Staff. Technical staff must be aware of the opportunities and responsibility to meet the goals of interoperability of information systems.

***G. Related Policies, Standards and Guidelines***

None currently in place.